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Software Testing Types

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Анотація

У даній статті подано основну інформацію про тестування програмного забезпечення. Представлено основні види тестування програмного забезпечення. Також розглянуто актуальність даного питання і його важливість для сфери інформаційних технологій.

Ключові слова: тестування, програмування, баг, тест-комплект, тест-кейс, ручне (мануальне) тестування, автоматизація, модульне тестування, розробка, стрес-тестування, навантажувальне тестування, бета-тестування.

Abstract

This article contains general information relating to software testing. The basic types of software testing are introduced. The urgency of the issue and its importance for the sphere of information technologies have been paid special attention to.

Keywords: testing, programming, bug, test suite, test case, manual testing, automation, unit testing, development, stress testing, load testing, beta testing.

Software testing is an investigation conducted to provide stakeholders with information about the quality of the product or service under test. Test techniques include, but are not limited to, the process of executing a program or application with the intent of finding software bugs (errors or other defects). It involves the execution of a software component or system component to evaluate one or more properties of interest. In general, these properties indicate the extent to which the component or system under test:
- meets the requirements that guided its design and development,
- responds correctly to all kinds of inputs,
- performs its functions within an acceptable time,
- is sufficiently usable,
- can be installed and run in its intended environments, and
- achieves the general result its stakeholders desire [1].

Test suite and test case are the general notions used at the process of software testing. A test case in software engineering normally consists of a unique identifier, requirement references from a design specification, preconditions, events, a series of steps (also known as actions) to follow, input, output, expected result, and actual result. These steps can be stored in a word processor document, spreadsheet, database, or other common repository. The most common term for a collection of test cases is a test suite. The test suite often also contains more detailed instructions or goals for each collection of test cases. It definitely contains a section where the tester identifies the system configuration used during testing. A group of test cases may also contain prerequisite states or steps, and descriptions of the following tests.

Software testing can performed manually or automatically. Manual testing is the oldest and most rigorous type of software testing. Manual testing requires a tester to perform manual test operations on the test software without the help of Test automation. Repetitive manual testing can be difficult to perform on large software applications or applications having very large dataset coverage. There is no complete substitute for manual testing. Manual testing is crucial for testing software applications more thoroughly.

Test automation is the use of software to control the execution of tests, the comparison of actual outcomes to predicted outcomes, the setting up of test preconditions, and other test control and test reporting functions. Commonly, test automation involves automating a manual process already in place that uses a formalized testing process. Another important aspect of test automation is the idea of partial test automation, or automating parts but not all of the software testing process. Testing tools can help automate tasks such as

product installation, test data creation, GUI interaction, problem detection (consider parsing or polling agents equipped with oracles), defect logging, etc.

Nowadays different types of testing are applied. Test types are introduced as a means that clearly define the objectives of a certain level for a program or project. A test type is focused on a particular test objective, which could be the testing of the function to be performed by the component or system; non-functional quality characteristics, such as reliability or usability; the structure or architecture of the component or system. Testing presupposes the confirmation that defects have been fixed (confirmation testing or retesting) and looking for unintended changes (regression testing). Depending on its objectives, testing will be organized differently. Hence there are many software test types. The most common are unit testing, load testing, stress testing, white box testing, black board testing, alpha and beta testing,

In computer programming, unit testing is a method of testing that verifies the individual units of source code are working properly. A unit is the smallest testable part of an application. In procedural programming a unit may be an individual program, function, procedure, etc., while in object-oriented programming, the smallest unit is a method, which may belong to a base/super class, abstract class or derived/child class. The goal of unit testing is to isolate each part of the program and show that the individual parts are correct. A unit test provides a strict, written contract that the piece of code must satisfy. As a result, it affords several benefits. Unit tests find problems early in the development cycle [2].

Load testing generally refers to the practice of modeling the expected usage of a software program by simulating multiple users accessing the program's services concurrently. As such, this testing is most relevant for multi-user systems; often one built using a client/server model, such as web servers.

Stress testing is a form of testing that is used to determine the stability of a given system or entity. It involves testing beyond normal operational capacity, often to a breaking point, in order to observe the results.

White box testing is based on the knowledge of the internal logic of an application's code. Internal software and code working should be known for this type of testing. Tests are based on coverage of code statements, branches, paths, conditions. While performing black box testing internal system design is not considered. Tests are based on requirements and functionality.

Alpha testing is done at the end of development. Minor design changes can be made as a result of it. Beta testing comes after alpha testing. Versions of the software, known as beta versions, are released to a limited audience outside of the programming team. The software is released to groups of people so that further testing can ensure the product has few faults or bugs. Sometimes, beta versions are made available to the open public to increase the feedback field to a maximal number of future users [3].

Software testing plays an important role at the software cycle development. It is a very popular and important field, which makes software better and easier for users.

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